## **Remarks/Arguments**

Applicants have received and carefully reviewed the Final Office Action of the Examiner mailed October 28, 2008. Currently, claims 29-34, 36-37, 39-45, 47-56, and 58-70 remain pending. Claims 29-34, 36-37, 39-45, 47-56, and 58-70 have been rejected. Favorable consideration of the following remarks is respectfully requested.

### ***Claim Interpretation***

In paragraph 2 of the Office Action, the Examiner has indicated that for purposes of examination, "the electrodes as claimed will be interpreted to be current collectors, since the catalyst layer is already contained in the membrane". The Examiner's attention is directed to her later position taken in the Office Action that the invention is not enabled specifically because a catalyst is not present in the membrane within the apertures of Figure 4C. Clarification of the Examiner's position with regard to whether a catalyst is, or is not present, is respectfully requested. Clarification is also requested as to the applicability of the marginal Comment (S1) found on page 2 of the Office Action mailed October 28, 2008 which appears to indicate that "Enablement rejection and art rejections cannot be applied at the same time." Clearly the direction provided in the comment has not been followed.

In paragraph 3 of the Office Action, the Examiner states that the claims 29-34, 36-45, 54-56 and 58-66 are drawn to method claims. The Examiner states these claims include, for example, "forming a first aperture ..." and "providing" various components. The Examiner then states that since an assembled fuel cell having the structural requirements of the method claims would inherently have been formed by "providing" those components, a fuel cell having the structure required by the method claims is interpreted to having been formed by that method. This is not believed to be appropriate in all cases. For example, claim 54 recites a "laminating" step, and claim 63 recites "passing the first length of material, the proton exchange membrane, and the second length of material through a joining unit". Certainly, a fuel cell would not inherently have been formed via the steps. The Examiner is directed to MPEP § 2112 IV, which states:

> The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. *In re Rijckaert*, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993) (reversed rejection because inherency was based on what would result due to optimization of conditions, not what was necessarily present in the prior art); *In re Oelrich*, 666 F.2d 578, 581-82, 212 USPQ 323, 326 (CCPA 1981). "To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is **necessarily present** in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.' " *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999)...

(Emphasis added). It is readily apparent that at least some of the claimed method steps would not necessarily be used in forming a fuel cell.

***Claim Rejections – 35 USC § 112***

In paragraph 6 of the Office Action, the Examiner rejected claims 29-34, 35-37, 39-45, 47-56, and 58-70 under 35 U.S.C. 112, first paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. As an initial matter, the Examiner is reminded that claim 35 had been canceled in a previous response. The Examiner has characterized the claims as directed to electrodes for a fuel cell, wherein the electrodes have apertures and a proton exchange membrane is sandwiched between the apertures. However, the claims are directed towards a fuel cell in which a proton exchange membrane is sandwiched between first and second structured electrode layers, where the electrode layers define apertures which are at least partially aligned. Further, the Examiner has characterized all pending claims, with no apparent justification, as represented by the embodiment illustrated in Fig. 4C, and has further characterized Fig. 4C as depicting a membrane covered by catalyst in all regions except those exposed by the apertures. This is not understood. The description of Fig. 4C is reproduced below:

> "FIG. 4C shows a proton exchange membrane 440 laminated between a first electrode 410A and a second electrode 410B. The first electrode 410A and the second electrode 410B can be similar to the electrode 410

> described above. In the illustrative embodiment, the adhesive layer 420 is disposed between the proton exchange membrane 440 and the first electrode 410A, and between the proton exchange membrane 440 and the second electrode 410B. Like above, the aperture of the first electrode 410A is at least partially aligned with the aperture of the second electrode 410B. The completed assembly forms a fuel cell 400. The proton exchange membrane 440 can further include a top and bottom catalyst layer adjacent the proton exchange membrane 440, as described above. FIG. 4D is a top schematic view of the illustrative embodiment of a micro fuel cell 400 shown in FIG. 4C."

Nothing in this passage suggests that the portions of the membrane 440 exposed through the apertures are, or must be, different from the portions of the membrane covered by the electrode layers. Further, the earlier description of the membrane mentioned in the passage clearly indicates that membrane 440 <u>can</u> optionally further <u>include</u> a top and bottom catalyst layer such as, for example, a carbon/platinum layer adjacent the proton exchange membrane. Accordingly, in those instances where the catalyst is present, the catalyst forms part of the proton exchange membrane 440 and is exposed where the membrane 440 is exposed as in the region corresponding to aperture 435.

The Examiner has also disagreed with Applicant's earlier response to a § 112, first paragraph, rejection which appeared to be largely based upon the Examiner's incorrect assumption that a catalyst is <u>required</u> as a component of a functional polymer membrane fuel cell, and a misrepresentation of the understanding of one of ordinary skill in the art with respect to the functionality of such a fuel cell absent a catalyst. The Examiner's attention is directed to, for example, US Patent No. 5,766,787, hereinafter Watanabe. Specifically, attention is directed to Cell D, described at column 8, lines 65-67 as: "[t]he solid polymer electrolyte membrane composed of <u>only</u> Nafion was employed as Comparative Example (emphasis added)" (i.e. with no catalyst). Cell D was compared to cells A-C in which Nafion membranes incorporated various platinum catalyst compositions.

Under suitable operating conditions, specified at column 9, lines 1-7, Cell D was characterized as follows: "[t]t can be seen from the results of FIG. 4 that under the humidified operation the <u>sufficient performance</u> could be obtained in Cell D." (Emphasis added.) Further, it will be seen in Fig. 4 that Cell D produced a current density of 1075

mA/cm$^2$ while the catalyzed Cells A-C produced <u>inferior</u> current densities of 886 to 1030 mA/cm$^2$ under the same conditions. Additionally, it will be seen in Fig. 5 of Watanabe that Cell D provided superior performance which persisted over an extended operation.

It should be noted that the instant application specifies, at page 7, line 5, that a Nafion® membrane is suitable for fabricating a fuel cell. One of ordinary skill in the art of fuel cells would certainly appreciate that increased operating temperature and/or increased partial pressures of one or both of fuel and oxidant will effectively serve to lower the activation energy for the reaction thereby rendering the use of a catalyst unnecessary. As such, the Examiner's assertion that the "state of the prior art supports the determination that the disclosure does not satisfy the enablement requirement since it is known within the art that a catalyst is needed to split the reactants into hydrogen and oxygen ions to perform the electrochemical reaction of a fuel cell" is not supported.

A second rejection of the pending claims as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention appears to rely entirely upon an incorrect interpretation of a single figure of the instant specification, Fig. 7, rather than upon the disclosure of the specification as a whole. The Examiner has asserted that Fig. 7 of the instant specification depicts cells that would short when electrical contacts are made without a load. While it is a true statement that a cell in which the anode and cathode are connected "without a load" would be described as "shorted", the cells of Fig. 7 are not so connected. Electrical contact 750A is shown on the <u>upper</u> surface of electrode layer <u>710A</u>, and electrical contact 750B is shown on the <u>upper</u> surface of electrode layer <u>710B</u>. As will be seen by the fact that the electrical contacts are differentiated from the rest of the electrode layers of Fig. 7, the remaining portions of electrode layers 710A and 710B are insulating. (See for example, the electrode layers of Figs. 1 and 4 which are depicted prior to patterning of the upper and or lower surfaces.) Accordingly, electrical contacts 750A and 750B are separated by the insulating component of electrode layer 710A in the region 755A where direct electrical contact might be present. Those conductive features found on the lower surface of electrode layer 710A are not shown in Fig. 7, and so one cannot properly assert that they are present in a location which would enable a direct electrical connection between electrical contacts 750A and 750B other than through an external load. Granting

for the moment that an electrical connection may be made between contacts 750A and 750B, the connection would simply provide a series (or parallel) connection of the fuel cells represented by fuel cells the membranes of which are exposed through apertures 735A and 735B and the adjacent unnumbered apertures located adjacent to reference numerals 745A and 745B. Unshorted contacts, one on the top side of 710A and a second, unseen contact lying on the lower surface of 710B would then be available for connecting a load to the two cell series (or parallel) configuration.

It appears likely that the Examiner has mistaken the broken lines indicating alignment of elements in the vicinity of elements 760A and 760B of Fig. 7 for conductive features, has assumed that said features span the gap between electrode layers 710A and 710B created by the thickness of interposed membrane 740, and has assumed that such features, if they existed, are necessarily in electrical contact with corresponding features on the upper surface of 710B. Instead, the broken lines simply provide the stated function of indicating that certain features are aligned in Figure 7. The text at page 14, lines 9-19 indicates that in some non-limiting embodiments one electrical contact associated with 710A extends laterally from the vicinity of a first aperture into region 760A where the proton exchange membrane is not found and that a second electrical contact associated with 710B extends laterally from the vicinity of a second aperture into region 760B where the proton exchange membrane also is not found, that in that embodiment the electrical contacts overlap, and that in such embodiments lamination <u>may</u>, but not necessarily does, cause the contacts to become electrically connected. Further, anyone of ordinary skill in the art would certainly understand how to connect individual cells in series, in parallel, or in series-parallel and how to connect a load to cells so connected. Incidentally, and while not preferred, a shorted cell would still <u>function</u> as a fuel cell in that current would flow in the shorting conductor(s) when fuel and oxidizer are present, with the load being provided by the (non-zero) resistance of the conductor(s) and useful work would be provided in the form of heat.

Applicants respectfully submit that the Examiner's assertion of inoperability in the absence of a catalyst is unfounded and request that the rejection of claims 29-34, 35-37, 39-45, 47-56, and 59-70 under 35 U.S.C. 112, first paragraph be withdrawn. Further, the configuration of contacts depicted in the specific embodiment of Fig.7 does not result

in a short circuit, the Examiner's assertion of inoperability of the invention is unfounded, and Applicants respectfully request that the rejection of claims 29-34, 35-37, 39-45, 47-56, and 59-70 under 35 U.S.C. 112, first paragraph be withdrawn.

As noted above, Applicants respectfully disagree with the Examiner's election to interpret the instant claims as directed to a membrane having catalyst layers applied, and Applicant's remarks will not be based upon such interpretation of the claims except in those claims in which a catalyst is explicitly provided. The scope of the claims that do not explicitly recite a catalyst include configurations that may or may not have a catalyst.

***Claim Rejections – 35 USC § 102***

In paragraph 9 of the Office Action, claims 29, 30, 33, 34, 36-45, 47, 48, 54, 56, and 60-66 were rejected under 35 U.S.C. 102(b) as anticipated by Pratt et al. (U.S. Patent No. 6,127, 058), hereinafter Pratt. After careful review, Applicant must respectfully traverse this rejection.

*"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference."* Verdegaal Bros. v. Union Oil Co. of California, *814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). (See MPEP § 2131).* As a preliminary matter, the Examiner appears to have adopted mutually incompatible characterizations of elements and their positions within the cells of the Pratt reference at various points in the Office Action. The Examiner is invited to provide a self-consistent interpretation of Pratt which is not inconsistent with the language of the claims in question in a future non-final Office Action.

Pratt is said to teach that the assembly of a membrane and two current collectors is held together by an adhesive. The text at column 5, lines 9-13 is cited as providing the description of the adhesive in question: "Obviously, the laminated structure comprising the MEA disposed between the two current collector assemblies must be held together. This can be accomplished by ultrasonically welding or by use of adhesives at the interfaces." The underlined word in that text is the sole occurrence of the words "adhesive" or "adhesives", and so that would appear to be the only teaching upon which the Examiner is relying. In that text, the use of adhesives is presented as an alternative to

earlier described ultrasonic welding. Pratt does not appear to disclose a conductive adhesive in any form and, indeed, the word "conductive" does not appear in Pratt. Ultrasonic welding appears only in that same passage and in claim 20: "The planar fuel cell as described in claim 19, wherein the first and second planar current collector assemblies are bonded to each other by ultrasonic weld." Note that the first and second planar current collector assemblies of Pratt are said to be bonded to each other, and that no components (e.g. current collectors) are said to be welded to the current collector assemblies. Instead, and in claim 19, the structures designated as the "current collectors" are insert molded into a thermoplastic frame. More specifically, claim 19, from which claim 20 depends, states:

> "A planar fuel cell system, comprising:
> first and second planar current collector assemblies, each comprising an array of current collectors insert molded into a thermoplastic frame, each of the current collectors in the array having a plurality of apertures for passing reactant gases and having an interconnect tab embedded into the thermoplastic frame to provide a gas tight seal;
> a membrane electrode assembly, comprising a single sheet of a polymer electrolyte membrane having an array of anodes disposed on a first major side and an array of corresponding cathodes disposed on a second opposing major side, all anodes being on the first major side of the sheet and all cathodes being on the second major side;
> the membrane electrode assembly disposed between the first and second planar current collector assemblies such that said array of anodes is adjacent to the array of current collectors in the first current collector assembly and said array of cathodes is adjacent to the array of current collectors in the second current collector assembly;
> the first and second planar current collector assemblies bonded to each other at their perimeters such that a gas tight seal is formed about the membrane electrode assembly;
> the interconnect tabs from the first and second planar current collector assemblies arranged to provide an electron transfer path from an anode to a neighboring cathode such that the electron transfer path does not traverse the thickness of the polymer electrolyte membrane; and
> whereby a fuel gas is distributed to each of the plurality of anodes through the apertures in the anode current collectors and whereby an oxidant gas is distributed to each of the plurality of cathodes through the apertures in the cathode current collectors."

Further, it should be noted that the only regions in which the current collector/frame assemblies appear to contact each other are outside of the perimeter of the membrane.

Pratt explicitly states at col. 3, lines 53-61 that the current collector 25 is "within the perimeter of the MEA and the interconnect means is outside the perimeter of the MEA." Pratt continues, "the plastic frame 24 forms a gas tight integral seal around the interconnect means." The current collector(s) are said to be not located in the region in which the seal is formed. Accordingly, the only ultrasonically weld/seal, or adhesive seal, which Pratt teaches or otherwise discloses, appears to be outside the perimeter of the MEA and specifically excludes the region where the current collectors are located, i.e., within the perimeter of the MEA. Pending independent claims 29 and 54 each recite a conductive adhesive and specify that the adhesive is located between the electrode layers and the proton exchange membrane as follows:

> 29. A method of forming a fuel cell, comprising the steps of:
> providing a first electrode layer having a first surface and a second opposing surface, wherein at least a portion of the first surface is conductive;
> forming a first aperture defined by a first aperture surface through the first electrode layer;
> providing a second electrode layer having a first surface and a second opposing surface, wherein at least a portion of the first surface is conductive;
> forming a second aperture defined by a second aperture surface through the second electrode layer;
> providing a proton exchange membrane having a first surface and a second opposing surface;
> providing a conductive adhesive between the first electrode layer and the proton exchange membrane and between the second electrode layer and the proton exchange membrane;
> sandwiching the proton exchange membrane and the adhesive between the first electrode layer and the second electrode layer with the first and second apertures substantially free of the adhesive, where the first aperture of the first electrode layer is at least partially aligned with the second aperture of the second electrode layer, thereby exposing the proton exchange membrane, wherein the second surface of the first electrode layer is proximate the first surface of the proton exchange membrane and the first surface of the second electrode layer is proximate the second surface of the proton exchange membrane;
> providing an electrical connection between at least a portion of the first surface that is conductive of the first electrode layer and the proton exchange membrane; and
> providing an electrical connection between at least a portion of the first surface that is conductive of the second electrode layer and the proton exchange membrane."

54. A method of forming a plurality of fuel cells, comprising the steps of:
providing a first length of non-conductive material having a first plurality of apertures therethrough and a first plurality of electrical contacts, wherein the first plurality of electrical contacts include one or more conductive contacts that extend through the first length of non-conductive material;
providing a second length of material having a second plurality of apertures therethrough and a second plurality of electrical contacts that extend through the second length of material;
providing a proton exchange membrane;
<u>providing an adhesive layer between the proton exchange membrane and the first length of material, between the proton exchange membrane and the second length of material, or between the proton exchange membrane and the first and second length of material;</u>
<u>laminating the proton exchange membrane and any adhesive between the first length of material and the second length of material</u>, where the first plurality of apertures are at least partially in registration with the second plurality of apertures, and wherein at least part of the proton exchange membrane is aligned with the plurality of first and second apertures to form a plurality of fuel cells; and
providing a plurality of electrically conductive connections between the proton exchange membrane and each of the first and second pluralities of electrical contacts.

Nowhere does Pratt appear to teach, disclose or suggest an adhesive, particularly a conductive adhesive, in any region of a fuel cell where said adhesive would be <u>between</u> a proton exchange membrane and a structure corresponding to a current collector as defined in the specification and claims of the pending invention.

In rejecting independent claim 47 over Pratt, the Examiner makes reference to the adhesive discussed above and asserts that it <u>necessarily</u> must be conductive; however, as seen below, claim 47 does not include an adhesive as a required element and the word "adhesive" does not appear in the claim.

47. A fuel cell comprising:
a first electrode comprising:
a non-conductive substrate, the non-conductive substrate having a first - electrode top surface, a first electrode bottom surface, and a first electrode thickness defined by a first distance between the first electrode top surface and the first electrode bottom surface;

a first electrode aperture through the first electrode thickness defined by a first electrode aperture surface;
a second electrode comprising:
a second electrode top surface;
a second electrode bottom surface;
a second electrode thickness defined by a second distance between the second electrode top surface and the second electrode bottom surface;
a second electrode aperture through the second electrode thickness defined by a second electrode aperture surface;
a first conductive layer provided on at least a portion of the first electrode top surface, at least a portion of the first electrode bottom surface, and one or more of at least a portion of the first electrode aperture surface and a through contact, wherein the first conductive layer on the one or more of the at least a portion of the first electrode aperture surface and the through contact provides an electrical connection between the first conductive layer on the first electrode top surface and the first conductive layer on the first electrode bottom surface;
a second conductive layer provided on at least a portion of the second electrode top surface;
a proton exchange membrane in electrical contact with and disposed between the first conductive layer and the second conductive layer;
wherein, the first electrode aperture is at least partially aligned with the second electrode aperture, thereby exposing the proton exchange membrane.

Instead, the fuel cell of claim 47 is differentiated from the fuel cells of Pratt at least in that the first electrode comprises a <u>non-conductive substrate</u>, a first electrode top surface, a first electrode bottom surface, a first electrode aperture defined by a first electrode aperture surface, a <u>first conductive layer provided on at least a portion of the first electrode top surface, at least a portion of the first electrode bottom surface, and one or more of at least a portion of the first electrode aperture surface and a through contact</u>.

The fuel cells of Pratt do not appear to include an electrode with two conductive outer surfaces and an inner <u>non-conductive substrate</u>. Pratt appears to contemplate two current collector structures. The first is described at column 3, lines 52-59 as comprising current collectors 25 insert molded into a plastic frame 24 as depicted in Fig. 2. Although Pratt does not appear to state that the current collectors are conductive, the Examiner has expressed an opinion that they must be. As depicted in Fig. 2, each of the six current collectors associated with one of the two frames appears to be a single homogeneous sheet of material. Pratt does not appear to describe any structure which could be

interpreted as layers to the current collectors of Fig. 2, and certainly makes no mention of a non-conductive intervening layer component.

The second current collector structure of Pratt is that of Fig. 4 which has been discussed extensively in earlier Responses. As noted above, the discussion of Fig. 4 is found in a single paragraph at column 5, lines 8-29 where the plastic film is characterized as: "FIG. 4 depicts an embodiment wherein the current collector assembly is fabricated in a very thin and flexible format by replacing the plastic frame with a plastic film 44 that has metal current collectors 45". Therefore, the functional characteristics attributable to the plastic film 44 would appear to be no more than those of the perimeter frame 24. The cited paragraph provides no additional structure to the depiction of Fig. 4 in which a single layer of metal has been applied to a single layer of plastic film. Thus, like above, there is no non-conductive intervening layer component. In the §103(a) rejection of claims 58-59, discussed below, the Examiner has expressly acknowledged that the contacts of Pratt "are only on one side of the non-conduction portion of the current collector." Pratt does not teach, in as complete detail as is contained in the claim and arranged as required by the claim, an electrode structure comprising two conductive surface layers on opposite sides of a non-conductive substrate wherein the two conductive surface layers are joined by a through contact, as recited in claim 47.

Similarly, in rejecting claim 63, the Examiner has failed to identify *either expressly or inherently described, in a single prior art reference*, that of Pratt, a step of "providing a first length of <u>non-conductive material</u> having a first plurality of apertures therethrough and a <u>first plurality of electrical contacts therethrough</u>" or a step of "laminating the first length of material, the proton exchange membrane, and the second length of material as they pass through the joining unit". Claim 63 recites:

> 63. A method of forming a plurality of fuel cells, comprising the steps of:
> providing a first length of non-conductive material having a first plurality of apertures therethrough and <u>a first plurality of electrical contacts therethrough</u>;
> providing a second length of material having a second plurality of apertures therethrough and at least a second electrical contact;
> providing a proton exchange membrane;
> passing the first length of material, the proton exchange membrane, and the second length of material through a joining unit, wherein the proton

exchange membrane is between the first length of material and the second length of material, the first plurality of apertures and the second plurality of apertures are at least partially aligned thereby exposing the proton exchange membrane therebetween, and the proton exchange membrane is in electrical contact with the first plurality of electrical contacts and the second electrical contact; and
<u>laminating the first length of material, the proton exchange membrane, and the second length of material as they pass through the joining unit</u>.

In attempting to support the rejection of claims 33-35, 42, 43, 54, and 56, the Examiner has characterized the plastic film as the frame and the metal current collector as two conductive surfaces in which the solid current collector also serves as a through contact. However, this interpretation does not appear to disclose a length of <u>non-conductive material</u> having a first plurality of electrical contacts <u>therethrough</u>. The conductive portions of the current collectors disclosed by Pratt do not appear to be described as anything other than monolithic sheets of conductor regions which are either supported by a frame or supported on a single surface of a plastic film. In the §103(a) rejection of claims 58-59, discussed below, the Examiner has expressly acknowledged that the contacts of Pratt "are only on one side of the non-conduction portion of the current collector." For at least these reasons, Pratt does not appear to teach or disclose all elements of claim 63.

The Examiner has referred to Figure 4 of Pratt with the assertion that the membrane assembly, unidentified in Fig. 4, "contains electrodes that are separated by an aperture, if one considers that the electrodes were all one sheet and then cut apart to form individual electrodes". The pending claims are not directed to electrodes separated by apertures, but rather to electrode layers <u>defining apertures therethrough</u>. Applicants are puzzled as to why the manner in which the MEA electrodes of Pratt are formed is relevant to whether gaps located <u>adjacent</u> to the individual MEA electrodes of the six fuel cell array of Pratt may be considered to provide apertures defined by aperture surfaces <u>through</u> the first and second electrode layers of the pending claims. This assertion is particularly puzzling in that the Examiner has specifically identified the current collectors of Pratt, rather than the electrodes of Pratt, as the elements which are said to correspond to the electrode layers of a single fuel cell of the pending claims. In the description of Fig. 4, the only reference to an electrode is in the following sentence, "In this case, the

plastic film contains holes to provide passage of fuel and oxidant to the electrode." (Col. 5, lines 20-21.) Additionally, at col. 4, lines 23-24, Pratt emphasizes that there are <u>no holes or apertures</u> associated with the MEA. As noted above, the Examiner appears to be inconsistent in her assignment of elements of Pratt to corresponding elements of the pending claims. Initially, the current collectors were said to correspond to the electrode layers and now the gaps between electrodes formed on the surface of an MEA are said to be the apertures "through the electrode layers". In either case, it is clear that there is no conductive adhesive between the current collector and the MEA disclosed by Pratt.

In the absence of *each and every element as set forth in the claim*, shown in as complete detail as is contained in the ... claim." Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989), Applicants respectfully request that the rejections of independent claims 29, 47, 54, and 63 be withdrawn. Additionally, for similar reasons as well as other reasons, claims 30-34, 36, 37, 39-45, 61, 69, and 70, claims 48-53 and 68, claims 55, 56, 58-60, and 62, as well as claims 64-66 which depend from claims 29, 47, 54, respectively, and include significant additional distinguishing features, are also believed to be clearly not anticipated by Pratt and Applicants respectfully request that the rejections be withdrawn.

***<u>Claim Rejections – 35 USC § 103</u>***

Claims 58-59 were rejected under 35 U.S.C. 103(a) as being unpatentable over Pratt in view of Diekmann et al. (U.S. Patent No. 6,268,076), hereinafter Diekmann. After careful review, Applicant must respectfully traverse this rejection.

"All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). (MPEP § 2143.03). As discussed above, nowhere does Pratt appear to disclose providing an adhesive layer between the proton exchange membrane and the first length of non-conductive material having a first plurality of electrical contacts including one or more conductive contacts that extend through the first length of material, a second length of non-conductive material having a second plurality of electrical contacts including one or more conductive contacts that extend through the second length of material and providing a plurality of electrically conductive connections between the proton exchange

membrane and each of the first and second pluralities of electrical contacts as recited in claim 54 from which claims 58-59 depend. Furthermore, nowhere Diekmann appear to remedy the shortcomings of Pratt by providing an adhesive. The word "adhesive" does not appear in Diekmann and the means of bonding contemplated by Diekmann appear to be limited to "welding, weld surfacing or brazing". Further, as discussed in detail in a previous communication, the Examiner has not identified an element of Diekmann which corresponds to a non-conductive material having conductive feed-throughs therethrough, said material acknowledged by the Examiner to be missing from Pratt. Therefore, Pratt in combination with Diekmann does not appear to teach all the elements of claim 54, as is required to establish a *prima facie* case of obviousness. As before, Applicants invite the Examiner to identify the first and/or second length of non-conductive material having one or more electrical contacts that extend therethrough and an adhesive layer between a proton exchange membrane and a first or second length of non-conductive material having a plurality of electrical contacts <u>therethrough</u> in either Pratt or Diekmann.

The cited portion of Diekmann, claim 12, appears to describe a current collector comprising a base and a contact element welded or brazed to a ridge of the base, said contact element being connected in an electrically conducting manner to the electrode of the fuel cell. The current collector of Diekmann does not appear to have connections that are "enveloped" in conductive material in claim 12 and if they did, it would appear to merely thicken the conducting assembly without providing either the missing adhesive or the missing length of non-conductive material having a first plurality of electrical contacts therethrough as found in independent claim 54. Providing additional conducting material around the conductive tabs 46 of Pratt as suggested by the Examiner does not appear to be taught by Diekmann, and would not appear to provide an electrical connection to the opposite of the polymeric film of Pratt since the conductive tabs (26,46) of Pratt are either simple extensions, e.g., wires, outside the frame, as in Fig. 2 or are features on the same surface of the polymeric film 45 as the metal current collectors 45 as may clearly be seen in Fig. 4. The Examiner is reminded that she has insisted that the current collectors 45 of Fig. 4, and by extension their continuations, the tabs 46, do not include the plastic film 44 when it was argued that the opposed surfaces of the metal current collector provided the first and second conductive surfaces in electrical contact

with each other. Additional conductive material applied "on all sides of the electrode tabs" 46 would only serve to thicken them. As taught by Pratt, the only connections made by the tabs 46 appear to cross the plane of the membrane electrode assembly and so only need to be accessible on that side of the polymeric film.

If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). (MPEP 2143.03) Accordingly, Applicants respectfully request that the rejections of dependent claims 58-59, which depend from independent claim 54 and add significant additional distinguishing features, be withdrawn.

Claim 55 was rejected under 35 U.S.C. 103(a) as being unpatentable over Pratt in view of Simonton (U.S. Patent No. 4,906,536), hereinafter Simonton. After careful review, Applicant must respectfully traverse this rejection. Simonton is said to teach, at column 12-25, dicing an array after it is formed. Initially, it should be noted that Simonton only has 10 columns, so Applicants are puzzled as to which portion of the reference the Examiner considers pertinent. The "array" of Simonton is a "tubelet panel of fabric face sheets and parallel, continuous film partition strips normal to the face sheets". The fabric tubelet panel is apparently then cut to length and used in the fabrication of a battery electrode. As such, this merely constitutes fabrication and size selection of a component, akin to cutting a component wire to length, rather than dicing single completed fuel cells from a continuous plurality of completed fuel cells. It has been acknowledged by the Examiner that Pratt fails to teach dicing the fuel cell array after it is formed. Simonton does not appear to teach dicing a fuel cell or other completed array of batteries. Applicants have found nothing in Simonton which remedies the deficiencies of Pratt as discussed above and applied to independent claim 54 from which claim 55 depends and to which it adds significant distinguishing features and therefore respectfully request that the rejection be withdrawn.

Claims 31 and 32 were rejected under 35 U.S.C. 103(a) as being unpatentable over Pratt in view of Stanley (U.S. Published Patent Application No. 2004/0053100), hereinafter Stanley. After careful review, Applicant must respectfully traverse this rejection. As detailed above, independent claim 29, from which claims 31 and 32 depend is believed to be clearly patentable over Pratt. Stanley is said to provide claimed

membrane and catalyst materials acknowledged to be missing from Pratt. Nothing in Stanley appears to remedy the deficiencies of Pratt as applied to claim 29. Accordingly, Applicants respectfully request that the rejections of claims 31 and 32 be withdrawn.

In the Response to Arguments, the Examiner returns to the incorrect assertion that a catalyst is necessary to the operation of a fuel cell. This has been dealt with by providing a reference, Watanabe, which describes a related fuel cell having the same proton exchange membrane without a catalyst which is said to provide sufficient performance, and further to provide higher current densities than the catalyzed cells to which it was compared. The Examiner also asserts that the adhesive of Pratt "must be conductive otherwise the current collector would be unable to collect the current and the battery would short." As discussed above, the fuel cells of Pratt do not appear to have an adhesive layer, conductive or otherwise, between the Membrane Electrode Assembly and the current collectors. The current collectors of Pratt appear to be in direct mechanical and electrical contact with the Membrane Electrode Assembly. The lack of an adhesive between the current collectors and the electrodes provides a portion of the patentable distinction between the fuel cells disclosed by Pratt and the fuel cell of certain of the pending claims.

***Conclusion***

In view of the foregoing, all pending claims 29-34, 36-37, 39-45, 47-56, and 58-70 are believed to be in a condition for allowance. Reexamination and reconsideration are respectfully requested. If a telephone conference might be of assistance, please contact the undersigned attorney at (612) 359-9348.

Respectfully Submitted,

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